

Toyota Motors Implementation of Artificial Intelligence

Posted on November 26, 2024

Introduction

The technological revolution has changed how people work, communicate, and live. From the development of the wheel to the creation of the internet, humans are more dependent on many aspects of technological advancement. Hence, the breakneck speed at which technology advances is causing profound changes to every facet of human life. Biotechnology, quantum computing, artificial intelligence, and robots are just a few examples of the promising technologies of today. These innovations provide new angles on pressing global issues, including climate change and public health crises (Renu,2021). Nonetheless, this presents us with new ethical and cultural challenges that we must overcome collectively. The future is mysterious and promising because of our efforts to push technology to its limits.

As a result of technological development, businesses are utilizing technology to boost internal efficiency and effectiveness and get an edge over competitors. Companies that don't take advantage of technology risk falling behind in today's competitive market. Technological progress aids businesses in several ways that provide them an edge in the marketplace: higher product quality, greater efficiency, better marketing strategies, and more invention and creativity. Toyota Motors should use its technology the same way that other companies do (Renu,2021). As the company's information technology manager, I am responsible for keeping the business up to date with technological developments and weighing the pros and cons of adopting emerging technologies. As the head of IT for a Toyota motors company, I appreciate access to the most recent and greatest digital innovation. But even if these are state-of-the-art technological advances, most people still don't use them. The possible effects of AI on businesses are a new area of interest for me. Consequently, this research aims to analyze the benefits of artificial intelligence (AI) for Toyota Motors and the factors (such as politics, economics, society, technology, law, and the environment) that may influence the company's decision to implement AI. This study will also analyze the benefits of AI investment for the company.

Company background

Toyota Motor Corporation is a Japanese multinational automaker. Kiichiro Toyota started Toyota Motors in 1937. Toyota is one of the world's major automakers, with an annual output of over 10 million vehicles. The company has expanded to 522 locations in 26 countries, with over 320 thousand

employees worldwide and 12 manufacturing facilities in Japan. Toyota Motor Corporation's stock price was the highest of any carmaker that year (Nkomo,2019). Toyota Motors has an extensive lineup of affordable, historically significant, and aesthetically pleasing automobiles. The company and its products have won several honors around the world. The worldwide company has an impeccable reputation and is the go-to for drivers worldwide (Nkomo,2019). Toyota Motors is successful thanks to its global supply network, well-known brand, and inventive capabilities. Toyota Motors' interactions with other facets of society, such as the government, the economy, and the law, are more aptly defined as a weird partnership than an antagonistic one.

PESTEL Analysis

Kaplan & Haenlein (2020) claims that the PESTEL analysis is a useful technique for determining the present and future environmental influences on a company. Political, Economic, Societal, Technological, Legal, and Environmental is abbreviated as PESTEL. Toyota Motors is not immune to the PESTEL elements that affect the success of other businesses. The political, economic, social, technological, environmental, and legal climate must be favorable for the advent of artificial intelligence to be successful.

Political Factors

As a technique to improve and enhance efficiency and effectiveness, Toyota motors are leveraging advanced technology such as artificial intelligence. The introduction of artificial motors is subject to political factors. One of the political factors that would affect the implementation of AI is government regulations and laws (Han et al.,2021). The automotive industry is a very sensitive industry that the government highly regulates to enhance security. As a result, the government is enacting rules and regulations that automakers have to follow to ensure that the manufactured products are safe, and that any technology implemented would not alter the safety of the products. To implement artificial intelligence in Toyota motors, it must comply with the rules and regulations to succeed (Brendel et., 2021). Additionally, with the advancement of technology, different governments across the globe are funding companies to advance their technology; hence Toyota motors may consider sourcing for this fund. However, the company would have to compete with other automakers for them to benefit. Kaplan & Haenlein (2020) asserts that the government provided tax benefits to the industry to encourage its growth within its borders. Thus, this can help attract people and money to the region and make local businesses more competitive in the global AI market.

Additionally, the geopolitical tensions across different states. Toyota Motors operates in several states, making it vulnerable to the varying geopolitical tensions between such states. For instance, export and import restrictions based on accusations that AI goods are hazardous could result from geopolitical conflicts (Han et al.,2021). Hence this would result in Toyota Motors' ineffective use of artificial intelligence. The government has strict privacy and security requirements for personal

information. Governments are passing more and more regulations to protect the privacy and security of people's data as artificial intelligence (AI) technology grows more reliant on these safeguards. Toyota Motors must follow these standards while creating AI technology to ensure the privacy and safety of its customers. Toyota Motors must protect its proprietary information regardless of the type of artificial intelligence it creates or uses (Sumra et al.,2022). Litigation against other companies for alleged patent infringement could drain financial resources.

Economic Factors

The financial impact of developing and launching AI systems is something that Toyota Motors must take into account. While AI's price has fallen in recent years, it may still be unreasonable for some businesses. This may be especially true for smaller communities that have fewer resources to draw from. In addition, Toyota would have to do more expenses like high people with greater AI to use the technology, cutting into the company's bottom line (Sumra et al.,2022). The organization must increase training and compensation costs to purchase new products. These would lead to an increase in training and compensation costs associated with the application of AI because the organization will need to hire new product designers. The possible properties of AI on the economy should also be considered. The implementation of AI in various industries has the potential to increase efficiency and productivity, both of which are beneficial to the economy. Yet, the broad use of AI may affect the economy negatively by displacing workers and decreasing productivity.

Additionally, Toyota motors need to consider the return on investment that it would get from the implementation of artificial intelligence. No assurance implementing AI would increase productivity, reduce expenses, or improve customer service (Han et al.,2021). In reality, these benefits are not always worth the effort and are not always attainable. Before determining whether or not it will be lucrative for Toyota, the corporation must compare the possible advantages to the cost. The business will then know for certain whether or not it is possible to generate a profit. Brendel et. (2021) opines that the demand for products and services enabled by AI is also important to the economy. Toyota may incorporate AI technology into its products to keep up with consumer demand. Toyota may have to wait for the market to recover before implementing AI if products with added intelligence perform poorly or don't sell.

Social Factors

Brendel et al. (2021) argues that the introduction of AI will have far-reaching effects on society. Toyota Motors' use of artificial intelligence is affected by societal issues, such as the prevalence of worries about the consequences of rising tech use. Cultural differences are one of the most influential aspects of AI deployment. Toyota Motor Corporation operates in several countries with vastly different cultural norms. While deciding whether or not to deploy AI, businesses must take into account cultural norms and preferences.

Furthermore, Toyota may discover that AI is unacceptable in the community owing to the societal dread of the unknown. The widespread disapproval of AI has the potential to slow its development and deployment. Companies should assuage customers' fears and doubts about artificial intelligence by highlighting the technology's many advantages. The moral implications of AI are an extra important social factor. Toyota must consider the implications that artificial intelligence will have because there is a growing level of worry in society about the ramifications and repercussions that will result from the adoption of higher technology and artificial intelligence. Some people worry that AI will be used in unfair or discriminatory ways. Businesses should develop and implement AI systems ethically, considering the potential ethical implications.

Technological Factors

Data availability is one of the technological factors affecting the implementation of artificial intelligence by Toyota motors. Data accessibility is of essential relevance to technology problems. For Toyota motors product designers to learn and make judgments, artificial intelligence (AI) programmers must be able to analyze large amounts of data (Panpatte & Ganeshkumar,2021). The advancement of AI systems could be hindered if crucial data is lacking or of poor quality, which could affect their effectiveness. Moreover, the support and infrastructure available for artificial intelligence include processing power and storage space and the quality, consistency, and dependability of networks and connections. Creating and employing AI systems effectively may be extremely difficult, if not impossible, without the appropriate infrastructure and support.

Based on Çitilci & Akbalık(2020) opinion, future technological advancement and the possibility of revolutionary innovations are additional factors that must be considered. Fast innovation in AI and other domains can have profound repercussions on the technical environment, with positive and negative implications for AI research and development. Organizations must keep tabs on AI and related technologies to prevent being blindsided by technological advances.

Environment Factors

Çitilci & Akbalık (2020) argues that the energy needs of AI systems must be considered from an ecological perspective. Several AI applications necessitate considerable computational power, which could lead to substantial energy usage. More greenhouse gases being released into the atmosphere could negatively affect the ecology. Organizations should evaluate the environmental effects of their AI systems and take measures to reduce energy use whenever possible. Additionally, Toyota needs to evaluate the technique in which they practice recycling and disposing of waste to avoid causing environmental harm; hence for environmental reasons, it is essential to plan for the eventual disposal and recycling of AI hardware and other devices (Panpatte & Ganeshkumar,2021). When more individuals adopt AI systems, there may be more electronic garbage that must be disposed of properly. Toyota motors must ensure that the trash is carefully disposed to avoid threatening the

natural ecology and environmental pollution. According to Panpatte & Ganeshkumar (2021), there is fear that the use of artificial intelligence would adversely affect agriculture and transportation with unintended detrimental effects on the natural world; thus, during the implementation of artificial intelligence, the company should be cautious and find a technique to mitigate such effects.

Legal factors

With AI, Toyota Motors could collect and analyze huge volumes of data from several sources. This information could contain details about their clients, staff, suppliers, and other parties and operations (Panpatte & Ganeshkumar, 2021). To guarantee that data is treated lawfully and openly, Toyota Motors must adhere to data privacy standards such as the General Data Protection Regulation (GDPR). In addition, because Toyota Motors will build its artificial intelligence technology, it must protect its intellectual property rights. Implementing artificial intelligence should not interfere with the company's patent rights and copyright. Çitilci & Akbalık (2020) also argues that implementing artificial intelligence should not lead to property damage and injuries; thus, Toyota motors should consider the legal liability requirements. For instance, there may be legal complexities about liability if an accident is caused by an autonomous vehicle equipped with artificial intelligence. Companies need to understand the potential legal hazards of AI and take measures to lessen their impact. Toyota Motors' AI quality should meet or exceed its buyers' expectations regarding security and dependability. Toyota Motors is also obligated to its customers to give them sufficient information about the company's usage of AI in its goods.

Reasons why Toyota motors would invest in Artificial Intelligence

In today's technologically advanced world, artificial intelligence (AI) has become known as an influential force that can transform every industry, especially the automotive industry. Currently various company are using technology as a technique to gain competitive edge against their rivals. Tesla motors and Toyota motors being in automotive industries are leveraging their technology in manufacturing of products and services. Artificial intelligence (AI) has become a powerful force in today's technology-driven society, capable of transforming all industries, particularly the automotive industry. It is now considered in the design of automobiles, as well as in their selection and operation. According to Dwivedi et al. (2021), by 2030, the compound annual growth rate for artificial intelligence will be 39.4% globally, reaching \$20.76 billion. Thus, Toyota Motors should put money into AI for the reasons given below.

Artificial intelligence boosts the company's profits

The primary purpose of any business is to increase profits every year. Toyota Motors may be able to reverse the downward trend in manufacturing profits by using AI technologies (AI). More and more specific information about vehicles, their components, and their drivers are becoming available, and it will be vital to use this information soon. Machine learning and data analytics are crucial for efficient demand planning (Ernst et al.,2019). What will end up happening? When fewer people own cars and fewer cars are on the road, automakers will have no choice but to cater to customer demand or risk becoming captive suppliers to fleet operators. If the auto industry switched to demand-based production, they would have to create just the vehicles that sell well. The company must invest in more state-of-the-art manufacturing equipment and practices to keep its profit margins high while decreasing production expenses. Intelligent robots used in factories and AI used to supply chain management may require an investment upfront, but they will pay for themselves in the long run.

Producing vehicles with high perceived value increases the automobile market and increasing sales. Wireless service, upgrade, and improvement delivery is the most convenient way for connected vehicles to generate revenue. The infotainment system may also generate affiliate revenue from third-party products and services. So, the automotive sector can benefit from the same artificial intelligence (AI) solutions driving the personalization trend in other sectors. Given the risk of falling sales and profits, this is paramount (Ernst et al.,2019). Without giving up any potential value-add money, the car sector must decide how to best use the main internet company's enhanced artificial intelligence (AI) and big data capabilities.

Improving vehicle safety

Toyota Motors may want to consider spending money on AI to make their automobiles safer for drivers and passengers. Artificial intelligence might enable technological advancements like identifying pedestrians, acknowledgment, and automated transportation. Artificial intelligence may recognize collisions to avoid them by using cameras and sensors to alert drivers of potential hazards and encourage them to take extra precautions. AI has improved adaptive cruise control's ability to maintain an appropriate distance between a vehicle and the vehicle in front of it. With adaptive cruise control, your speed changes based on how far you are from the vehicle in front of you using sensors and cameras. There is less chance of being engaged in a rear-end collision. AI could use sensors to warn drivers when they veer off the road.

Hence this would allow drivers to regain control of their vehicles and avoid any potential accidents. Brendel et. (2021) asserts that most pedestrians are killed or injured when automobiles fail to see them; thus, sensors have been developed, thanks to AI, that can alert drivers to the presence of pedestrians. Nikitas et al. (2020) thinks that drivers' attention and fatigue levels can be monitored with the help of AI. Cameras and sensors track the driver's eyes, head, and face to check their

attention.

Improved car manufacturing

Given its position as one of the world's biggest automakers, Toyota Motors may wish to consider investing in artificial intelligence to enhance its manufacturing process. Toyota Motors' product designers can use AI to tailor-create all future car models that meet customers' needs and expectations. Automobile production is a collaborative endeavor between humans and machines equipped with artificial intelligence. The robots collaborate with humans in vehicle production and are constantly learning new skills, such as the ability to plan and build parts. Automakers respond to shifting consumer preferences by adding or removing vehicle features. Incorporating AI and ML into automotive manufacturers' production methods allows for more efficient use of available resources.

Creating user experiences that are interesting and unique

Artificial intelligence (AI) is integral to driver assistance technology in many new cars. It scans the driver's irises to detect signs of fatigue. The car's AI learns the driver's preferences for everything from temperature and audio to navigation. Hence this makes traveling a lot more pleasurable, easy, and relaxing. Automakers and software developers collaborate to improve the driving experience with artificial intelligence. According to Brynjolfsson et al. (2018), this creates a more engaging and customized user experience. Thus, if Toyota motors invest in artificial intelligence, it could improve its cars, thus granting its clients a better experience which would help in creating customer loyalty and helping the company gain a competitive edge. Dwivedi et al. (2021) argues that artificial intelligence makes buying and selling cars seamless for consumers. Future interfaces for customers will employ artificial intelligence to suggest cars based on an individual's driving history, age, health, and insurance. The coming generations of vehicles will use artificial intelligence to create high-resolution three-dimensional pictures of the road and receive immediate information on traffic and roadside crises.

Reflection and Conclusion

The PESTLE analysis suggests spreading out your AI funds. The pros and downsides of AI are varied. AI improves efficiency and cuts costs. Both the business and its patrons stand to gain from this. The business must deal with the high cost of AI technology and staff. Investment is required in hardware, software, and human resources. Massive investments in hardware, software, and manpower are required to solve these problems. PESTLE analysis is useful for those working in IT. As a result, businesses may innovate because IT departments can foresee and respond to changes in the global market. IT managers and others should jointly analyze emerging technologies using the PESTLE

framework.

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